Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Modernizing the E-rate	)	WC Docket No. 13-184
Program for Schools and Libraries	)	

REPLY COMMENTS OF ADTRAN, INC.

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Summary

As explained in these Reply Comments, many of the other commenting parties share ADTRAN's belief that the public interest would best be served by a policy of technological neutrality for the E-rate program. Support for technological neutrality was voiced by incumbent telephone companies, cable service providers, wireless service providers and others. While a few commenters seek to game the system to favor particular technologies, the Commission can and should readily reject those attempts. The Commission should adopt a policy of technological neutrality, because the most efficient broadband technology for any particular deployment will vary. In addition, broadband technologies continue to evolve.

ADTRAN also observes that other commenters shared ADTRAN's call to subsidize internal connections and to prescribe quality standards for latency and jitter, in addition to adopting speed/data rate objectives. Finally, ADTRAN urges the Commission to reject a few of the commenters' calls for significant expansion of the E-rate program beyond what Congress intended. Congress directed the Commission to support services to schools and libraries – not to subsidize student laptops or service to students while off campus. In addition, under the Antideficiency Act, the Commission is also limited in its ability to make long term commitments of E-rate funds.

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ADTRAN, Inc. ("ADTRAN") hereby replies to some of the comments filed in response to the Commission's proposal to reform the E-rate program for schools and libraries.[1] As explained below, many of the other commenting parties share ADTRAN's belief that the public interest would best be served by a policy of technological neutrality for the E-rate program. On the other hand, ADTRAN urges the Commission to reject the attempts by a few of the commenters to game the system to favor particular technologies. ADTRAN also observes that other commenters shared ADTRAN's call to subsidize internal connections and to prescribe quality standards for latency and jitter, in addition to adopting speed/data rate objectives. Finally, ADTRAN urges the Commission to reject a few of the commenters' calls for significant expansion of the E-rate program beyond what Congress intended.

[1] *Modernizing the E-rate Program for Schools and Libraries*, FCC 13-100, released July 23, 2013, 28 FCC Rcd 11304 (2013)(hereafter cited as "*NPRM*").

The E-rate Program Should be Technology Neutral

In its initial comments, ADTRAN explained why it was important for the Commission to apply to the E-rate Program its same policy of technological neutrality that it applies to other subsidy programs. The *NPRM* raised questions as to whether the Commission should attempt to favor a particular technology -- fiber -- or whether the Commission should design the E-rate Program in a technology neutral manner. While ADTRAN acknowledged that fiber is normally the most robust broadband technology, the Commission should not dictate that schools deploy fiber for their broadband connections. The Commission should adopt a policy of technological neutrality, because the most efficient broadband technology for any particular deployment will vary. In addition, broadband technologies continue to evolve.

Given the permutations and changes, the Commission should not assume that fiber will always be the best solution. For example, for particularly remote schools or libraries, satellite may be the only cost-effective solution. For smaller schools where copper infrastructure is already in place, bonded and vectored DSL and/or Ethernet over copper may be the ideal solution. Requiring all schools to deploy fiber would not be an efficient use of the limited E-rate program funds. Particularly given the cost constraints on the E-rate program, a "one size fits all" approach of "fiber only" could slow the deployment of necessary high-capacity broadband connectivity to many schools and libraries.

Many of the other commenters shared ADTRAN's position and urged the Commission to ensure that the E-rate program is technology neutral. The largest incumbent carriers called for

technological neutrality. Verizon (at pp. 9-10) observed that:

> Importantly, when establishing goals for the E-rate program, the Commission should not mandate that schools and libraries buy particular services or use particular technologies – such as fiber – in order to meet the benchmark speed targets. Fiber deployment may be cost prohibitive or simply unnecessary in some areas or for some schools, and no one service is best suited to all circumstances. Accordingly, the E-rate program should remain technology neutral, allowing schools and libraries the flexibility to select the technology that best meets their needs. (footnotes omitted)

In a similar vein, AT&T (at p. 4) explained that:

> AT&T is concerned that the proposals and inquiries in the Broadband Connectivity section of the NPRM are heavily focused on issues related to schools and libraries utilizing dark fiber and the construction issues associated with building private fiber networks, leaving the impression that the Commission assumes that private fiber networks are the only way that schools can obtain access to high speed broadband. Any such assumption is incorrect. Other technology platforms, such as hybrid-fiber loops, wireless data, satellite, and cable, are capable of delivering high speed broadband to E-rate applicants, and do so more efficiently and economically than fiber in certain circumstances. Accordingly, the Commission cannot make private fiber networks the only, or indeed the "favored," solution to achieve its goal of ensuring schools and libraries have access to high-speed broadband connections that are capable of supporting current and future educational applications. Rather, it must ensure that the E-rate program provides comparable support for all technology platforms on a technology-neutral basis, consistent with long-standing E-rate policies.

CenturyLink also supports technological neutrality, noting at p. 5:

> Schools and libraries -- and, in some instances, services providers -- already have significant sunk investment in facilities. The Commission should be very wary about redirecting funding to what it perceives to be the best technological architectures. Fiber is ordinarily preferable, but it is not the only technological option. Smaller schools and many libraries may not need the bandwidth associated with fiber and may be adequately provisioned with existing copper facilities. Small, remote facilities may be adequately and more sensibly served by microwave. A service provider can explain the benefits of the technological options available.

Calls for technological neutrality in the E-rate program were also offered by the cable service

industry. The National Cable Television Association (at p. 9) eloquently stated that:

> [T]he Commission should ensure that funding decisions are made on a technology neutral basis. Just as we do not encourage the Commission to establish one-size-fits-all connectivity mandates or targets, we also recommend that the Commission adopt a technology neutral approach rather than assuming that one technology (fiber) is the best choice in every scenario. While cable networks are extremely fiber-rich and cable operators often will deploy fiber directly to schools, there are some cases where installing fiber to a school will not be a cost effective option for delivering broadband service when all installation, maintenance, and equipment costs are considered. In addition, as noted above, in the future cable operators will be rolling out services that employ DOCSIS 3.1 technology that will enable the delivery of multigig speeds without the need for a direct fiber connection. The Commission should ensure that the E-rate program is supporting the most cost-effective options in each case, not simply supporting technologies and services that generate the most buzz.

Likewise the American Cable Association (at fn. 8) urged that "In defining high-speed broadband connectivity, the Commission should follow its precedent in the Connect America Fund and base it on network performance, regardless of technology."

ADTRAN's arguments in favor of technological neutrality were also echoed by wireless carriers. Sprint (at pp. 3-4) asserted that:

> The principle of competitive and technological neutrality remains as key and as relevant today as it ever was, and the Commission must scrupulously apply it as it considers changes to the E-rate program in the instant proceeding. The Commission must avoid adopting any rules which tilt the playing field in favor of a particular technology or particular category of service provider, or which strongly encourage (even force) schools and libraries to deploy a pre-determined technology.
>
> E-rate is not and should not be a one-size-fits-all program. A network configuration that is highly efficient and which makes sense for one large urban school or school district may be inappropriate for a different large urban school, for a large rural school, or for a small school. Furthermore, over time, technological innovations will occur which can change the relative economics and network performance of various network solutions; for example, wireless "LTE Generation 5.0" may prove to be the equal of various wireline broadband solutions in terms of speed, while continuing to offer the unmatched benefits of mobility. Thus, it is critical that any new E-rate rules adopted by the Commission "give schools flexibility to select the best technology that meets their needs" (NPRM, para. 77), both current and future.

Similar sentiments were included in the comments of CTIA, which indicated (at p. 8) that:

> As a result, there is no basis to prioritize any particular broadband technology above another for E-rate support. Competitive and technological neutrality has long been a central principle of the universal service program, and should remain so. The Commission should not abandon it to force schools into a one-size-fits-all paradigm that artificially prioritizes any particular broadband technology.

Likewise, PCIA (at p. 7) expressed its belief that technological neutrality is essential:

> Consistent with its support of the elimination of service prioritization, PCIA urges the Commission not to adopt a regulatory preference for the deployment of fiber and other technologies over existing or future broadband delivery technologies. The FCC should remain technology-neutral and avoid initiating a new *de facto* prioritization schedule where the agency picks technological winners. As discussed above, freedom in network design should be the goal. Different settings necessitate varied technologies due to any number of variables, including access to public rights-of-way, environmental, historic considerations, etc. Therefore, the FCC should maintain technological flexibility and not implement a preference for the deployment of one technology over another. (footnote omitted)[2]

The State Educational Technology Directors Association (SETDA) also urged the Commission to adopt a policy of technological neutrality. SETDA (at p. 21) explained:

> With the adoption of capacity goals, SETDA believes that it will be important to be 'loose' on the means to achieving them by increasing freedom for participants to develop and deploy the most cost-effective approaches and technologies in line with adopted plans and priorities. To the extent possible, SETDA believes the Commission should be technology-neutral in its rulemaking, taking into consideration the rapid pace of innovation in products and services and not picking winners and losers in the marketplace by overly restrictive eligible services determinations.[3]

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[2] Other wireless service providers also supported technological neutrality, including the Competitive Carrier Association at pp. 2 and 5, and HITN at p. 2.

[3] Additional commenters supporting technological neutral included Illinois Fiber (at p. 5) ("[Requests for Proposals] should allow for different technical solutions by different vendors."); and TIA at p. 2:

> To make certain that schools and libraries can benefit from the dynamic technological developments associated with telecommunications generally and broadband specifically, the Commission should provide these institutions flexibility in the E-rate program to select the solutions they need, consistent with a general principle of technological neutrality.

In sum, a wide variety of commenters joined ADTRAN in calling for technological neutrality.

Technological neutrality can be accomplished by the Commission's setting reasonable standards and objectives for the broadband services to be acquired by schools and libraries, and requiring that those criteria be met regardless of technology. In its initial comments, ADTRAN explained that the criteria should include not only speed/data rate, but also parameters for latency and jitter. ADTRAN urged the Commission to specify that technologies used to satisfy the E-rate broadband deployments must be capable of supporting a one-way delay in the access network of no more than 100 ms and jitter of 50 ms, consistent with ITU Recommendations.[4] ADTRAN was not alone in calling for specifications of more than just speed/data rate.[5]

The Commission Should Disregard the Few Requests for Favored Treatment

In contrast to the broad array of support for technological neutrality in the E-rate program, a few commenters seemingly sought to have the Commission tilt the playing field in

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[4] However, in cases of particularly insular deployments where satellite may be the only cost-effective alternative, the Commission could allow a relaxation of these specifications.

[5] *See, e.g.*, Internet2 at p. 14:

> The Commission also proposes setting forth performance requirements for quality of services, such as latency, jitter, and packet loss, that are tailored to the specific uses of broadband connectivity by schools and libraries to ensure successful learning experiences. Because connectivity speed is only one piece of the high-capacity broadband puzzle, Internet2 fully supports this proposal. Consistent with the requirements of Section 254(b)(1), "quality" of broadband service is just as important as speed. To be successful, real-time, remote instruction and use requires broadband service that is low latency, has less jitter, and reduces packet loss. Low quality broadband with instances of high jitter or latency rates degrades online, remote, and virtual education programs, interrupting the flow of education and student attention, and ultimately diminishes the overall educational experience. Therefore, creating benchmark performance requirements for quality of service to ensure that online learning experiences are usable should be a high priority for the E-rate program.

favor of their particular broadband service. The Wireless Internet Service Providers Association (at p. 5) claimed that for small and insular schools, "the Commission's rules and policies should prioritize fixed wireless solutions." Qualcomm (at p. 1) asked the Commission to enact rules to "provide E-rate funding for 3G and 4G mobile broadband connectivity." Sunesys (at p. 5) argues that "[t]he Commission should prioritize promoting fiber-based broadband solutions over other types of broadband architecture."[6] Illinois Fiber (at p. 7) suggests that "for most locations, the use of fiber should be strongly encouraged." The New America Foundation (at p. 3) also seems to suggest the Commission should bias the E-rate program to support fiber deployment:

> To meet these goals, the Commission must do more than set targets for the next few years. It must prioritize significant investments in future-proof technologies. To do so, it should align support for dark fiber with that of lit fiber; it must facilitate investment in fiber, particularly community-owned fiber; it must implement specific performance standards to ensure that future service contracts are made for fiber, rather than outdated service offerings ....[7]

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[6] Sunesys seems to be of two minds on this, because Sunesys also goes on to state (at p. 6):

> This is not to say that other technological architectures, such as coaxial cable, wireless and microwave, should receive no support. Where an application of such technology is either the most cost-effective or, in some instances, the only solution available to a school or library, then E-rate funds should be made available. The end goal of the E-rate program should not be about artificially choosing which technology is the winner, but rather finding the best solution for schools and libraries in each situation. While the vast majority of the time that solution will be fiber, in those instances when it is not, the Commission should keep enough flexibility into the E-rate program to allow schools and libraries to choose an alternative.

[7] On the other hand, the New America Foundation also seems to acknowledge that fiber is not always the best solution, observing (at pp. 4-5) that "In addition, when owned by schools, libraries, or other entities in the community, fiber is a cost-effective option in the long term ***in most situations***, even if the upfront investment costs seem significant." (emphasis added)

And Internet2 (at p. 15) also suggests the Commission ought to favor fiber deployment:

> The Commission has requested comment on the most efficient technological architectures that schools and libraries are likely to use for connectivity. While there will be limited circumstances that require non-fiber-based solutions, the Commission should generally promote support for scalable, flexible, and affordable fiber infrastructure solutions. These fiber-based infrastructure solutions should primarily focus on terrestrial buried fiber followed by overhead fiber installations, whether dark or lit (discussed more fully below). In instances where it is not feasible to implement fiber infrastructure, microwave or other fixed wireless solutions may also provide an acceptable solution.

Other commenters sought to evade technological neutrality by calling for lower speed/quality standards or no such standards. Sprint (at p. 6) seems to suggest that the Commission should not establish quality standards for broadband service to schools and libraries:

> Second, a speed requirement, particularly if used as the sole or predominant E-rate eligibility criterion, can effectively foreclose the use of certain technologies or may prove to be excessively costly. It may be that a wireline arrangement can provide very high upload or download speeds. However, that speed may come at a prohibitively high cost; a somewhat lower speed may still meet the needs of an E-rate applicant but at a more affordable price, or may come with additional valued benefits (such as mobility). E-rate applicants should have the flexibility to make the desired trade-offs to deploy a broadband connection solution that best meets their individual needs.[8]

SmartEdgeNet (at p. 9) also sought to avoid the imposition of quality standards:

> The Commission should not condition the availability of E-rate funds on services meeting specific service characteristics. Doing so would be counter-productive, for several reasons. First, it may not be realistic. E-rate recipients will receive different services from different providers and it is inevitable that service characteristics will vary accordingly. Second, service quality characteristics requirements could inappropriately favor one technology over another for reasons that may not actually enhance the

[8] On the other hand, Sprint elsewhere in its comments (at pp. 2-3) supported technological neutrality, quoting from the National Broadband Plan:

> The National Broadband Plan emphasized that "[t]he eligibility criteria for obtaining support from CAF should be company- and technology-agnostic so long as the service provided meets the specifications set by the FCC."4 [4: *Connecting America: The National Broadband Plan* (released March 16, 2010), p. 145.]

> provisioning of services. Third, service "quality" capabilities may vary on a market-to-market basis such that standards set by the Commission could limit the number of bidders an E-rate customer receives for service. Fourth, it should be assumed that all schools and libraries will seek to obtain the highest quality service possible. Imposing minimum service quality requirements on E-rate recipients is, therefore, unnecessary.

The Commission should reject these various requests to bias the E-rate program rules to favor particular technologies or omit quality standards. The most efficient broadband technology for any particular deployment (capable of meeting the speed and quality objectives of the E-rate program) will vary, depending on a multitude of factors, including the facilities already deployed, the size of the school, and topology. Without quality standards, however, there is no assurance that students will be able to obtain the myriad benefits of 21st Century broadband. Moreover, as ADTRAN explained in its initial comments, the Antideficiency Act (31 U.S.C. §§ 1341(a), 1342, and 1517(a)) limits the ability of the E-rate program to make long-term commitments that would support new fiber deployment. ADTRAN thus urges the Commission to heed the call of the vast majority of commenters and adopt a policy of technological neutrality for the E-rate program, including the use of quality standards that do not vary by technology.

Support for Internal Connections

In its initial comments, ADTRAN explained that broadband service to schools and libraries must be robust in order to facilitate the kinds of research and distance-learning that are key to a modern and well-rounded education. But that is not enough -- in addition, the broadband access must be available to all students throughout the school. Every classroom ought to be connected—simply providing access to a "computer lab" is no longer sufficient. Other commenters also urged the Commission to make the internal networks a primary, not

secondary priority for the E-rate program. For example, SETDA (at p. 19) explained:

> As noted by the Commission in the NPRM (¶143), a high-capacity broadband connection to the school doors that cannot be efficiently and effectively distributed throughout the building to students and teachers serves no one's interests. A modernized E-rate program must be structured to support the delivery of broadband to and within all school buildings. As such, SETDA supports the simplification and merging of Priority 1 and 2 services, allowing local school districts the freedom to design and deploy cost-effective, comprehensive solutions that meet student and teacher needs in line with adopted capacity targets (*E-rate NPRM* ¶¶ 103-104, 143-149, 248-251). This will serve the dual purpose of helping to reduce the burden of the current application process, as well as to encourage the development of new, innovative solutions to meet school needs.

Similarly, NCTA (at p. 8) urged the Commission to support fully internal networks:

> Wireless technologies, such as Wi-Fi, can provide cost effective high-speed broadband throughout school and library buildings and within classrooms. NCTA supports targeting E-rate support to Wi-Fi services that will foster connectivity to classrooms and other areas in the school where students congregate in a cost effective manner and make it more likely that schools will be in a position to take advantage of higher capacity offerings from service providers.

The New America Foundation (at p. 3) succinctly told the Commission that it must "ensure that schools and libraries have the ability to not only connect their premises, but also to spread that connectivity adequately within their facilities." The Commission should ensure that internal connections are supported, consistent with the suggestions of ADTRAN and other commenters.

Limits to the E-rate Program

ADTRAN recognizes that there are limits on what the Commission can do with respect to reform of the E-rate program. Unfortunately, a few of the other commenters appear not to realize that the Commission does not have unbounded discretion and resources with regard to the E-rate program. For example, US Cellular (at pp. 5-7) urges the Commission to continue E-rate subsidization of cellular service. ADTRAN disagrees. It is critical that the Commission re-focus the E-rate program to support the deployment of broadband service to and throughout schools,

and any dollars used for other services (like cellular) cannot be allocated to broadband deployment.

The budget for the E-rate program is not unlimited, and as it is the Universal Service Fund contribution factor of 15% or more is dampening demand for telecommunications services. US Cellular (at pp. 11-12) suggests that the Commission utilize the USF contribution reform proceeding to expand the funding of the E-rate program, but changing the contribution methodology cannot magically create additional money – any additional funds would have to come out of the pockets of consumers of telecommunications. The costs of continuing to subsidize less critical services such as cellular would need to be recovered, and it is not clear that it would be any more efficient to impose those costs on consumers of telecommunications, rather than on the citizens and businesses that generally fund education through state and local taxes.

While their comments are somewhat ambiguous, the Hispanic Information and Telecommunications Network, Inc. appears to be suggesting (at p. 3) that the E-rate program should subsidize redundant broadband connections to schools and libraries:

> Further, wireless and fiber broadband should not be considered duplicative, and the Commission should allow for applicants to receive funding for both fiber and wireless broadband. Many applicants may want to receive E-Rate funding for both fiber and wireless service and each applicant should be able to apply for the appropriate combination of services that best suits its needs.

Given the budget constraints on the E-rate program, however, we simply cannot afford to subsidize duplicative or redundant broadband connections to schools and libraries.

Qualcomm seeks to have the E-rate program subsidize mobile broadband service, along with the mobile devices, so that students can have ubiquitous access to broadband on and off campus. In its comments (at p. 1), Qualcomm suggested that:

> The FCC should enact the specific proposals in the 2010 E-rate NPRM and the National Broadband Plan to provide E-rate funding for 3G and 4G mobile broadband connectivity and also fund devices so that underprivileged students can keep pace with all other students who are using mobile broadband tools after school and on weekends to complete assignments, access libraries of information, and collaborate with classmates from the comfort of their homes, on the long bus ride to and from school, and countless other locations off of school grounds.

Likewise, Qualcomm (at p. 12) argued:

> Furthermore, eSchool News reports that most barriers to enabling schools to adopt mobile technology are financial, with most school districts reporting that they would purchase tablets if they could afford them because of their ability to support personalized learning and cater to different learning styles. E-rate can and should meet that need.

While the notion of subsidizing ubiquitous student access (even while away from school) and mobile devices is admirable, the budget constraints on the E-rate program would not make such an expansion of the program feasible. Consistent with its advocacy of technological neutrality, ADTRAN has no objection to use of wireless technology to provide broadband connectivity to schools and libraries (assuming it meets the requisite speed and quality standards), but we cannot afford to provide, in addition, subsidies for mobile devices and broadband access to students wherever they may be.

Moreover, such an expansion of the E-rate program would be beyond Congress' authorization of power to the Commission. Section 254(h)(2)(A) commands the FCC to "establish competitively neutral rules … to enhance, to the extent technically feasible and economically reasonable, access to advanced telecommunications and information ***services*** for all public and nonprofit elementary and secondary school ***classrooms***, health care providers, and libraries." (emphasis added). Subsidizing devices and off-campus services would exceed these

statutory directives.[9] The Commission should thus reject Qualcomm's proposal to significantly expand the E-rate subsidies.[10]

Conclusion

As explained in these Reply Comments, many of the other commenting parties share ADTRAN's belief that the public interest would best be served by a policy of technological neutrality for the E-rate program. Such a policy would most efficiently achieve the primary goal of ensuring that all schools and libraries have access to affordable, high-speed broadband service, as opposed to the attempts by a few of the commenters to game the system to favor particular technologies. ADTRAN also observes that other commenters shared ADTRAN's call to subsidize internal connections and to prescribe quality standards in addition to speed/data rate objectives. Finally, ADTRAN urges the Commission to reject a few of the commenters calls for

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[9] *Cf.*, NCTA at p. 6:

> There is widespread agreement that improving the level of broadband that is available to students and teachers in the classroom offers the potential for numerous benefits and that reforming the E-rate program is a critical step in achieving such improvement. Realizing these benefits will be challenging, however, due to the complex nature of the E-rate program and the fact that a variety of important factors, such as teacher training and devices for students, are outside the scope of the program.

[10] In addition, as ADTRAN explained above and in its Initial Comments in this proceeding, the Antideficiency Act limits the Commission's ability to commit to long-term subsidies. While there have been a series of annual "fixes," absent permanent legislative relief, it would appear that the Commission's proposal to allow multi-year commitments could be problematical.

significant expansion of the E-rate program. Reforming the E-rate program as advocated by ADTRAN and those that shared its views will best serve the public interest.

Respectfully submitted,

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